and its advantages in the physical laboratory, since the fiftieth part of a milligramme can be estimated by it quicker than by the ordinary method.

SOCIETIES AND ACADEMIES

LONDON

Physical Society, Nov. 21.—Dr. J. H. Gladstone, F.R.S., president, in the chair.—Prof. Macleod described a simple arrangement he had devised for showing internal resistance in battery cells. Two tubes about half a metre long, one of which is about twice the diameter of the other, are closed at their lower ends with corks. On the corks and within the tubes rest two discs of platinum foil connected with binding screws by platinum wires passing through the corks. The plates are covered with chloride of silver and the tubes are filled with a solution of chloride of zinc. Each tube is provided with a disc of amalgamated zinc soldered to a long insulated copper wire. The discs are cut so that they nearly fit the tubes, one being exactly double the diameter of the other, and therefore exposing four times the surface to the action of the liquid. On connecting the terminals with a galvanometer, the current will be found to increase as the distance between the zinc and platinum plates is diminished by lowering the zinc plate into the tube. In order to obtain the same deflection of the galvanometer by the narrow cell, the distance between the plates must be one-fourth those of the larger ones. The apparatus may also be used to show that opposed cells of the same kind will not produce a current. For this purpose the platinum plates are connected together and the two zinc plates joined to the galvanometer. No current will flow, whatever the distance between the plates.—Mr. James Baillie Hamilton, of University College, Oxford, made a communication on the application of wind to stringed instruments. Mr. Hamilton commenced with a short history of the efforts which had been made to bring the Eolian harp under human control, and explained how he himself had taken up the matter from Mr. John Farmer on leaving Harrow School. Mr. Farmer had succeeded in getting wind to do the work of a bow upon a string by attaching a reed to the end of it, forming thus a compound string from which a few notes of great beauty could be obtained. Mr. Hamilton, in attempting to complete a perfect instrument, soon found he had undertaken an almost impossible task, from difficulties which he explained to the Society. Failing to obtain advice or assistance, either from scientific men or from the musical instrument makers, he was once more thrown upon his own resources, and, conscious both of his responsibility and difficulties, resolved to leave for a time his university career, and to investigate to the uttermost a matter on which no information could be there obtained. The results of his investigations were then shown to the Society. After two years of labour, Mr. Hamilton had not only gained experience sufficient to perform what he had undertaken, but had also discovered that by a different mode of employing the same material, *i.e.* a string and a reed, he could secure for a string the advantages it afforded by an organ-pipe in addition to those which it already possessed. Showing a pianoforte string on a sound-board, he said: "Such strings already possess certain advantages; first, simplicity of reinforcement by a common sound-board; second, economy of space; third, blending of tone; and fourth, sympathy. Can I also secure for this string the advantages of an organ-pipe—namely, first, special reinforcement; second, volume of tone; third, choice of quality; and fourth, sustained sound?" Accordingly, an open diapason pipe was proposed for imitation, and, to the general surprise, the string was made to exactly imitate it in all these respects. Another string was next sounded, representing the note of the largest organ-pipe in use, in conjunction with other notes, satisfying the hearers that not only could a string do all the work of an organ-pipe in giving volume and sweetness to the note reinforced, but could afford the exquisite sympathetic and blending power hitherto peculiar to strings. Such notes were also sounded seven octaves apart. The reinforcement corresponding to the pipe was secured by the utilisation of a node which cut off from the string a segment corresponding to the note reinforced, presenting to all appearance the phenomenon of an organ built by nature out of a string. This node being a source of motion, is also utilised for gaining quickness of speech, since a cord, acting as a damper and stretched across the nodal line of a series of strings, serves to communicate instantaneous sound from key to key. Another invention of Mr. Hamilton's was a string which could not be put out of tune, to the great surprise of those who attempted to do so. He also exhibited a new pianoforte string, which by its purity and volume of tone showed that the results of a grand pianoforte could be obtained in a cottage instrument. Mr. Hamilton having satisfactorily answered several questions respecting possible objections, concluded by reminding the Society that it was in attempting faithfully to carry out the designs of another man that he was now in a position not only to perform what he had undertaken, but had also been permitted to bring into use a simpler, purer, and grander source of sound than had been contemplated when he laid his hand to a task which he was still engaged in perfecting.

Anthropological Institute, Nov. 24.—Prof. Busk, F.R.S., president, in the chair.—Col. Lane Fox exhibited and described specimens of stone implements, bows, arrows, and blowpipes from San José, Costa Rica. Mr. Charlesworth exhibited characteristic figures, carved in amalgam by Mexican miners, and a chaplet of gold and silver coins as worn by the women of Nazareth.—A brief paper by the late Mr. Cotesworth was read, On ruins in the neighbourhood of Palmyra; with Notes on some skulls found therein, by the President. The ruins described were groups of towers and tombs lying north and south of the Kuryelein road on the hills facing the castle. In one of these towers were discovered many skulls and other human remains, some of which were exhibited on the table. The date of their deposition could not, in the opinion of the author, be less than 1,800 to 2,000 years ago. There were also large underground tombs showing the same arrangements as in the towers. An examination of the remains by the President showed that they belonged to individuals of a dolichocephalic race of large rather than small stature, but by no means gigantic. A short time since Capt. Burton had forwarded skulls to the Institute presenting the same characteristics as the specimens under consideration.—Mr. W. Bollaert contributed Notes on some Peruvian antiquities, and exhibited a series of drawings and photographs in illustration, which he gave to the Institute.

MANCHESTER

Literary and Philosophical Society, Nov. 17.—Edward Schunck, F.R.S., president, in the chair.—Some remarks on Dalton's first table of atomic weights, by Prof. Henry E. Roscoe, F.R.S. This has already appeared in NATURE, vol. xi. p. 52.—Action of light on certain vanadium compounds, by Mr. James Gibbons.—On basic calcium chloride, by Harry Grimshaw, F.C.S.—On the structure of Stigmaria, by Prof. W. C. Williamson, F.R.S., which we hope to give next week.

PHILADELPHIA

Academy of Natural Sciences, July 21.—Dr. Ruschenberger, president, in the chair.—Prof. Persifor Frazer, jun., described a coal-cutting machine, designed by Mr. James Brown, of Brazil, Indiana. It consists of a steel or iron wheel, set in a frame, connected with the pneumatic engine, which runs in rails laid parallel to the face of the heading, which in this case may be several hundred yards long. On the outer periphery of this wheel are arranged twenty or thirty triangular-shaped pieces of steel, united with it at one of their apices by a pin. In the middle of the opposite side, which is curved, are firmly-fixed chilled-steel teeth, which set themselves by friction against the coal to the proper position for cutting, as the wheel is rotated to the right or left. The motion is imparted by means of a small-toothed wheel which moves in rack-work on the under-surface of the wheel.

July 28.—Dr. Ruschenberger, president, in the chair.—On report of the committees to which they had been referred, the following papers were ordered to be published:—Description of a new species of Helix, by James Lewis, M.D.—On some Batrachia and Nematognathi, brought from the Upper Amazon by Prof. Orton, by Edward D. Cope.—Notes on American Lepidoptera, with descriptions of twenty-one new species, by Aug. R. Grote.—Determination of the Species of Moths figured in the "Natural History of New York," by Aug. R. Grote, A.M.

Aug. 4.—Dr. Ruschenberger, president, in the chair.—Mr. Thomas Meehan exhibited some branches of *Acer Pennsylvanicum*, Lin. (*A. striatum*, Lamb), which had a remarkable system of dimorphic foliage. The first pair of leaves developed after the bursting of the bud in the spring, were larger and more perfectly developed than any subsequent ones. The next pair were usually lancelinear. Occasionally there was a tendency to the production of a pair of lobes, but usually the margins were

entire or sparsely serrulated. The third and subsequent pairs of leaves partook of the form of the first pair, though seldom so large. It was worthy of remark, that in plants with alternate leaves, the leaves with their axial buds were generally about the same size. In some few instances there were variations in the size, especially in the $\frac{1}{3}$ arrangement of the leaves on the stem. In opposite leaved plants the rule was the other way; one bud or one leaf, either in the blade or petiole, being larger or longer than the other. In the maples this was especially the case. At times the petioles in some cases would be not more than half the length of the opposite. He had found this especial peculiarity, however, in no other species but *A. Pennsylvanicum* that he had been able to examine, which included most in common cultivation. It might be in *A. spicatum*, Lam., which he had not been able to examine this season, and which he supposed to be but a variety of *A. Pennslyvanicum*.

Aug. 25.—Dr. Ruschenberger, president, in the chair.—Prof. Leidy exhibited a living specimen of the freshwater ciliated polyp, formerly described by him under the name of *Pectinatella magnifica*. Pectinatella is by far the largest of all the known freshwater ciliated polyps, and, indeed, is not surpassed by any of the marine forms known to us. It has not been determined whether the huge Pectinatella colonies start each from a single individual, or are the result of the confluence of a number of small colonies. On the approach of winter the colonies die and undergo decomposition, in which process the remarkable winter eggs or statoblasts are liberated. These are provided with anchor-like spines, by which, as in the case of the eggs of skates and sharks, they become attached to various fixed bodies. In examining various common animals of our household, Prof. Leidy had found a thread-worm infesting the common house-fly. The worm is from a line to the tenth of an inch long, and lives in the proboscis of the fly. It was found in numbers from one to three in about one fly in five. The parasite was first discovered in the house-fly of India, by the English naturalist, Mr. H. J. Carter, who described it under the name of *Filaria muscæ*, and suggested the opinion that it might be the source of the Guinea worm, *Filara medinensis*, in man. Mr. Carter states that he found from two to twenty of the worms in one fly of three. Dr. Diesing referred the parasite to a new genus with the name of *Habronema muscæ*. The singular position in which the worm lives suggests the many unsuspected places we have to search to find the parents or offspring of our own parasites.

PARIS

Academy of Sciences, Nov. 16.—M. Bertrand in the chair.—The following papers were read:—On a new class of organic compounds, the carbonyls, and on the true function of ordinary camphor, by M. Berthelot. The author classes as carbonyls the three bodies, ordinary camphor, oxide of allylene, and diphenylacetone.—Action of heat on ordinary aldehyde, by M. Berthelot.—On the carpellary theory according to the Liliaceæ and the Melanthaceæ, by M. A. Trécul.—On wounds from trepanning and their dressing, by M. C. Sédillot.—Observations on the November shooting stars, by M. Leverrier.—On the age of the Pyrenean red sandstone and relationship to the Saint-Béat statuary marble, by M. A. Leymerie.—On electric induction, by M. P. Volpicelli.—Action exercised by an electro-magnet on the spectra of rarefied gases traversed by the electric discharge, by M. J. Chautard. The author has hitherto examined only the spectra of metalloids. The magnet appears to influence the number, position, fineness, &c., of the spectral lines in a special manner for each element.—Note on magnetism and on a new exploding fuse, by M. Trève.—On the circulatory system of the Echinidæ, by M. Edm. Perrier.—Note on the manufacture of paper from *gombo* (*Hibiscus esculentus*), and on the industrial uses of this plant, by M. Ed. Landrin.—On the relationship existing between the chemical composition of the air in the swim-bladder and the depth at which the fish are taken, by M. A. Moreau.—Unwholesomeness of the Seine in August, September, and October, 1874, by M. Boudet.—Method pursued in searching for the most efficacious substance for resisting Phylloxera at the viticultural station of Cognac, by M. Max Cornu.—Effects produced by the first frosts on the phylloxerised vines in the vicinity of Cognac, by M. Maurice Girard.—A despatch was read from the French Minister at Pekin, and a letter from M. Fleuriais, announcing the safe arrival and installation of the Transit of Venus Expedition in that city.—On two points in the theory of substitutions, by M. C. Jordan.—On fluorene, by M. Ph. Barbier. The formula for this hydrocarbon is $C_{26}H_{10}$. The author has examined many of its derivatives.—On the marsupium of the eye of birds, by MM. J. André and Beauregard.—New method for the antiseptic occlusion of wounds, by M. Sarazin.—On the mutability of microscopic germs and on the passive function of the organisms classed as *ferments*, by M. J. Duval.—The carboniferous limestone soil of the Pyrenees, by M. Henri Magnan.—The shooting stars of November 1874, by M. Chapelas.

Nov. 23.—M. Cl. Bernard in the chair.—The following papers were read:—Meridional observations of the minor planets made at Greenwich Observatory (forwarded by Sir G. B. Airy, Astronomer Royal) and at the Observatory of Paris during the third quarter of the year 1874, communicated by M. Leverrier.—M. H. A. Weddell communicated a botanical note on the algolichenic theory.—Note on the gum-bearing Acacia of Tunis, by M. Doûmet-Adanson.—On new improvements in magneto-electric machines, by M. Z. T. Gramme.—On the saccharine matter contained in mushrooms, by M. A. Müntz.—Effects of potassium sulphocarbonate on Phylloxera, by M. Mouillefert.—M. Max Cornu presented a paper containing the continuation of his researches for the most efficacious substance for the destruction of Phylloxera.—Experiments made on branches of vine immersed in water containing various substances in solution, by M. A. Baudrimont.—Facts relating to Phylloxera and to the submersion of vines and cereals; application of M. Naudin's process to vines that cannot be submerged, by M. G. Grimaud.—On the stability of the equilibrium of a heavy body resting on a curved support, by M. C. Jordan.—Influence of temperature on the coefficient of capillary flowing of liquids, by M. A. Gueront.—On the product formed by the addition of hypochlorous acid to propylene, by M. L. Henry.—On the Actiniæ of the oceanic coasts of France, by M. P. Fischer.—New researches on the organogenesis of *Lophospermum erubens*, by M. Frémineau.—M. E. Duchemin communicated a note concerning the invention of the circular compass.—During the meeting the perpetual secretary announced to the Academy the safe arrival at Sydney of MM. André and Angot, the members of the Transit of Venus Expedition who are to observe this phenomenon from Noumea.

BOOKS AND PAMPHLETS RECEIVED

BRITISH.—Report of Newcastle-on-Tyne Chemical Society.—The Aërial World: G. Hartwig (Longmans).—Transits of Venus: R. A. Proctor, B.A. (Longmans).—Descent of Man (New Edition): Charles Darwin, M.A., F.R.S. (J. Murray).—Transactions of the Institute of Engineers and Shipbuilders in Scotland. Report on Safety Valves.—Chambers's Information for the People (W. and R. Chambers).—The Origin of Civilisation and the Primitive Condition of Man: Sir John Lubbock, Bart., M.P., F.R.S. (Longmans).—Elements of Embryology: M. Foster, M.A., M.D., F.R.S., and F. M. Balfour, B.A. (Macmillan and Co.)

AMERICAN.—Relation between the Barometric Gradient and the Velocity of the Wind: Wm. Ferrel, A.M. (Washington, U.S.)—Complete Works of Count Rumford, vol. iii. (Boston, U.S.)—Proceedings of the American Society of Arts and Science (John Wilson, Boston).—Proceedings of the American Philosophical Society (Philadelphia).—Annotated List of Birds of Utah: H. W. Henshaw (Salem, U.S.)—Report of Explorations of 1873 of the Colorado of the West: Prof. J. W. Powell (Washington).—Synopsis of the Flora of Colorado: T. C. Porter (Washington).

FOREIGN.—Correspondenzblatt des Naturforscher-Vereins zu Riga.—Observacions magneticas y Meteorologicas (Havana, Cuba).

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